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(71) Applicant: **OMRON CORP**

(72) Inventor:  
**TANAKA TAKAHIDE**  
**FURUTA TADASHI**  
**NISHIMURA JUTARO**  
**KITaura HITOSHI**

**(54) AUTOMATIC URINE INSPECTION DEVICE**

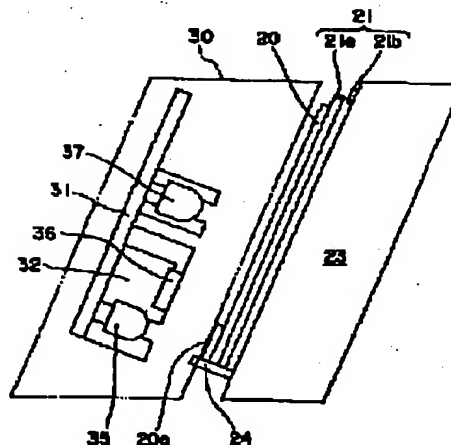
for inspecting urine is provided.

**(57) Abstract**

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**PURPOSE:** To obtain an automatic urine inspection device which can be maintained easily.

**CONSTITUTION:** A title item allows a reagent portion 20a which is provided at one edge portion of an urine testing paper 20 to be dipped into an urine which is sampled for a certain amount of time and then a degree of color development at the reagent portion 20a of the urine test paper 20 which is placed at a mobile inspection stand 23 to be detected and processed optically by a sensor 36 for inspecting urine which is provided at a detection portion 30. A sensor 37 for measuring distance which measures a distance to the urine test paper 20 is provided at the detection portion 30, at the same time the mobile inspection stand 23 is controlled according to a measurement result of sensor 37 for measuring distance, and a control portion for adjusting a distance from the sensor 36 for inspecting urine to the reagent portion 20a is provided, thus enabling the mobile inspection stand 23 where the urine test paper 20 is placed to be positioned without any contact to the detection portion 30 where the sensor 36



(a) Translation-in-part of Japanese Unexamined Patent  
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[WHAT IS CLAIMED IS]

[Claim 1] Apparatus for automatically analyzing urine test by dipping a urine test paper into a urine sample for a prescribed time, wherein said urine test paper is provided with a reagent portion at one marginal edge thereof, and optically detecting and processing a degree of color development at said reagent portion by means of a sensing device for urine test, wherein said urine test paper is supported on a supporting member, and wherein said sensing device for urine test is provided at a detection portion;

characterized in that a sensing device for measuring a distance to said urine test paper is provided at said detection portion, and a controlling means is provided for controlling at least one of said supporting member and said detection portion according to a result measured at said sensing device for measuring a distance and adjusting said distance to said urine test paper.

[0013] An arm 26 has a chuck member 27 for capturing the urine test paper 20 at the leading edge thereof. The arm 26 can be reciprocated in obliquely upper and lower direction through two rods 28, 28 by means of motor 29.

[0014] As shown in Fig. 7, a detection portion 30 has a printed circuit board 31. A frame member 32 is secured on a printed circuit board 31, in the frame member 32 there are arranged an LED 35 and a sensing

device 36 for urine test. The sensing device 36 is composed of a photodiode. Further, a sensing device 37 is secured on the printed circuit board 31 for measuring a distance. The number of the LED 35 and the sensing device 36 for urine test corresponds to the number of the reagent portion 20a. As shown in Fig. 8, the sensing device 37 for measuring a distance and the sensing device 36 for urine test are connected with an analog-to-digital converter 41 and a CPU 42 through a multiplexer 40. The LED 35 is also connected with the CPU 42. Please note in Fig. 8 there is only shown a relation between the detection portion 30 and the urine test paper 20 against the control unit 19.

[0016] First of all, as shown in Fig. 4, one sheet of the urine test paper 20 is paid off from an accommodation part 22 for the urine test paper. The above-mentioned one sheet of the urine test paper 20 falls down along a sloped surface of the mobile inspection stand 23 until the urine test paper 20 is stopped by a pin 24 for deciding a location. When the mobile inspection stand 23 is stopped after forwarding to a prescribed position, the arm 26 lowers from obliquely upper side, then the upper marginal edge of the urine test paper 20 is captured by the chuck 27, thereafter the arm 26 is moved a little in obliquely upper direction, and the mobile inspection stand 23 is moved backward to return to the initial position of the mobile inspection stand 23. As a result, one sheet of the urine test paper 20 is paid off from an accommodation part 22 for the urine test paper as mentioned above. The one sheet of the urine test paper 20 falls down along a sloped surface of the mobile inspection stand 23 until the urine test paper 20 is stopped by a pin 24 for deciding a location.

[0017] Then, the arm 26 is lowered again, and raised in the obliquely

upper direction after the reagent portion 20a of the urine test paper 20 is dipped in sampled urine 51 for a prescribed time which is contained in a container 50 for urine test. Thereafter, the mobile inspection stand 23 is moved in forward until the mobile inspection stand 23 is stopped at the prescribed position. As a result, the chuck 27 of the arm 26 is opened, and the urine test paper 20 falls down along the surface of the water absorption paper 21 placed on the mobile inspection stand 23 until the urine test paper 20 is stopped by the pin 24.

[0019] When the mobile inspection stand 23 is moved forward, the LED is activated, and the multiplexer 40 is switched to the sensing device 37 for measuring a distance. As a result, the data concerning the distance are loaded by the sensing device 37, and the data is converted by the analog-to-digital converter to obtain a converted value. The converted value is compared with the reference value L by the CPU 42, which is inputted beforehand in the CPU 42. If the converted value is not identical to the reference value L, and the converted value is more than the reference value L, then the mobile inspection stand 23 is moved forward by driving the motor (not shown in Figures) by the CPU 42. On the other hand, if the converted value is less than the reference value L, then the mobile inspection stand 23 is moved backward by reversing the motor (not shown in Figures) by the CPU 42.

[0020] If the converted value is identical to the reference value L, then the motor is stopped by the direction from the CPU 42, and at the same time the multiplexer 40 is switched to the sensing device 36 for urine test. As a result, the light reflected on the reagent portion 20a is detected by the sensing device 36 for urine test, and converted by the analog-to-digital converter 41 and subjected to an operation process by

the CPU 42. Thereafter, the result of measurement is displayed on the display unit 16 every inspection items, and printer 17. Please note that the reference value is defined as a distance from the reagent portion 20a and the sensing device 37 for measuring a distance.

FIG. 2

